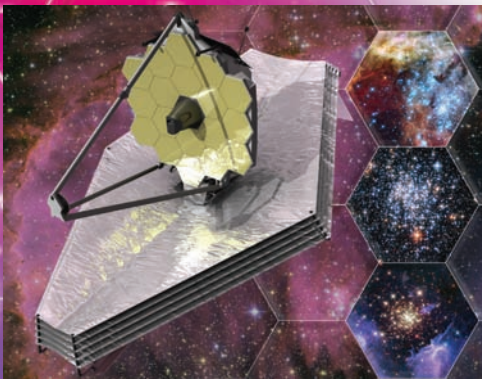


# Hubble and Webb:

## A tale of two telescopes

The Hubble Space Telescope, the iconic astronomical observatory of our times, has spectacularly extended our understanding of the Universe – from nearby planets to the most distant galaxies. As often happens in science, discoveries raise new questions that are sometimes tantalizingly beyond present capabilities. The James Webb Space Telescope is designed to continue - and expand - the legacy of scientific discovery from Hubble.



Both telescopes share similar goals: to explore the Universe and improve our understanding of processes such as the assembly and evolution of galaxies, star birth, and the formation of planets orbiting other stars as well as objects in our own Solar System. This shared purpose is reflected in their common features: mirrors to collect light from distant stars and galaxies, and sensors that convert that light into digital images and spectra. They both work in the vacuum of outer space, and use radio signals to transmit their images to Earth. Both also have solar panels that collect energy to power the telescope, and pointing control systems that keep the telescope extremely stable while taking data.



Despite their similarities, these two telescopes are very different. Webb will be optimized for infrared light, unlike Hubble, which observes in ultraviolet and visible light and has only limited near-infrared capabilities. Webb will also have a much larger primary mirror that will enable it to collect more light than Hubble. Seeing in the infrared is essential for viewing objects at the edge of the Universe, since the light from these far-away objects is red-shifted from the visible into the infrared wavelengths by the expansion of our Universe. Observing far into the infrared also allows Webb to see deep into the dusty cocoons where stars and planets form.

### Size Matters

The primary mirror of a telescope collects the light from the objects that the telescope observes. The larger the primary mirror, the more light the telescope collects. The area of Webb's mirror is 6 and a quarter times larger than Hubble's, which will enable it to see objects that are fainter and farther away. Webb's size will allow scientists to peer back to a time when galaxies were just forming!

